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Leveraging Digital FinTech in Microfinance Institutions for Enhanced Financial Inclusion, Sustainable Performance, and Women's Empowerment: A Narrative Review

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Abstract: *Microfinance Institutions (MFIs) play a vital role in advancing financial inclusion and socio-economic empowerment, aligning directly with the United Nations' Sustainable Development Goals (SDG 2030), particularly poverty reduction, gender equality, and decent work. Despite their importance, many MFIs continue to face challenges in sustaining financial viability while upholding their social mission. The rise of digital financial technologies (FinTech), such as mobile banking, block chain, artificial intelligence, and big data has introduced innovative solutions to longstanding challenges by lowering operational costs, expanding service outreach, and promoting greater transparency. However, the intersection of FinTech with economic empowerment, sustainability and social inclusion remains underexplored in existing research. This literature review aims to examine how the adoption of FinTech influences the performance of microfinance institutions (MFIs). Specifically, this review sets to contribute too ongoing discussions surrounding FinTech's role in fostering sustainability, advancing women's empowerment and promoting inclusive economic growth. The findings provided MFIs with a fresh perspective to consider digital transformation, highlighting the interplay between digital literacy, regulatory frameworks, and the suitability and progression of digital initiative. By critically analysing these dynamics, the review deepens our understanding of how FinTech integration can shape both the operational efficacy of MFIs and the broader socio-economic environments in which they operate.*

Keywords: Digital FinTech, Financial Inclusion, Microfinance Institutions (MFIs), Sustainable Performance, Woman Empowerment.

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1. Introduction

Microfinance institutions (MFIs) have been instrumental in facilitating financial inclusion by serving as a conduit between the formal banking sector and unbanked population, particularly in areas where conventional banking infrastructure remains underdeveloped. Originating as informal credit groups, these entities have evolved into sophisticated financial intermediaries providing a range of services, including actively extending credit, savings facilities, and financial literacy initiatives, to disadvantaged communities. The substantial contributions of

microfinance institutions in advancing poverty alleviation, resiliency, and inclusive growth developments have been widely appreciated, especially regarding the 2030 Sustainable Development Goals (SDGs), such as SDG 1: No Poverty, SDG 5: Gender Equality, and SDG 8: Decent Work and Economic Growth (Marfo et al., 2015; Wanzala and Obokoh, 2015). However, MFIs are still struggling with the contradiction between financial viability and their social purpose, so sustainability in the long run cannot be assured.

In recent years, digital financial technology (FinTech), such as mobile banking, blockchain, AI, big data, etc., has become a strong driving force for MFI transformation. The use of such instruments lowers transaction costs, simplifies risk management and extends the outreach, especially for countries of South Asia and sub-Saharan Africa where availability of physical banking equipment is quite limited (Liu et al., 2024; Mondol et al., 2024; Louw and Nieuwenhuizen, 2020). But persistent issues undermine these achievements. In Kenya, for example, the introduction of M-Pesa has brought numerous complications.

Nevertheless, ongoing challenges threaten to diminish these progressions. For instance, in Kenya, the introduction of M-Pesa has greatly improved access to financial services, yet studies highlight that rural women still face barriers due to low digital literacy and socio-cultural restrictions, limiting their ability to fully benefit (Akeju, 2024). In Bangladesh, mobile payments provided by bKash expanded reach, though gender inequities in access remain observed as men are more willing to use mobile payments while women are restricted by infrastructural limitations as well as safety concerns (López-Sánchez et al., 2023). In India, government initiatives such as Jan Dhan Yojana supplemented by digital wallets expanded inclusion though concerns remain rampant regarding over-indebtedness as well as mission drift when MFIs adopt risky digital credit strategies (Dorfleitner et al., 2022). However, in Malaysia, institutions like AIM as well as TEKUN embraced digital channels effectively to offer microloans; though rural connectivity gaps as well as digital illiteracy programmed weaknesses remain pressing issues (Mondol et al., 2024).

From Scopus documents, academic works on Digital FinTech, Financial Inclusion, Microfinance Institutions (MFIs), Sustainable Performance, and Women's Empowerment rose sharply between 2006 to 2025, to as many as 32 documents in 2024 from fewer than 5 in 2006, to demonstrate consistent research as well as excellent promise in this transdisciplinary area. India leads global output, followed by the United States and Malaysia, while key contributors include Ashta A., Mia M.A., Dorfleitner G., and López-Sánchez P., among others. This growing literature underlines the relevance and urgency of summarizing the fragmented findings in a coherent framework.

Nevertheless, prior reviews remain limited in scope. Some focus solely on MFIs and financial inclusion (Roodman, 2013), while others examine isolated FinTech innovations without addressing their combined influence on sustainability and gender empowerment (Milana & Ashta, 2020). Moreover, empirical evidence tends to be region-specific, such as single-country case studies in Africa or South Asia, overlooking broader global perspectives. Critical questions remain unresolved: (1) Do efficiency gains from digitalization compromise personal relationships central to microfinance trust? (2) Does FinTech inadvertently widen digital divides by privileging literate, urban populations? (3) How do regulatory and institutional frameworks condition the success of digital transformation? Addressing these ambiguities demands a comprehensive and integrative review. To situate this paper within the broader scholarly conversation, ten recent review papers are summarized in Table 1, highlighting the range of methods and thematic foci shaping the field.

Table 1: Methods and Thematic Foci

Year	Focus/Remarks	Reference
2020	Reviewed mission drift and sustainability challenges in MFIs	Milana & Ashta (2020)
2013	Analysed traditional microfinance models and inclusion outcomes	Roodman (2013)
2022	Examined digital credit scoring and AI adoption in MFIs	Hassan et al. (2022)
2024	Focused on blockchain for transparency in financial systems	Mondol et al. (2024)
2024	Reviewed digital tools in sustainable performance	Liu et al. (2024)
2024	Investigated cultural barriers in digital adoption for women	Akeju (2024)
2023	Studied rural divides in digital microfinance access	López-Sánchez et al. (2023)
2022	Assessed operational efficiency vs outreach trade-offs	Dorfleitner et al. (2022)
2023	Explored capacity-building and institutional readiness	Asnawi et al. (2023)
2017	Evaluated social vs financial objectives in microfinance	Hamdani & Ibenrissoul (2017)

Sources: Scopus database

The primary objective of this review paper is to systematically synthesize how FinTech adoption in MFIs influences financial inclusion, sustainable performance, and women's empowerment. Specifically, it aims to trace the evolution of digital tools in MFIs, examine operational and socio-economic impacts, evaluate institutional and regulatory mediators, and identify challenges and emerging trends. The contribution of this study lies in its integrative perspective: unlike earlier fragmented analyses, it critically unites three interlinked domains, financial inclusion, sustainability, and gender empowerment through the lens of FinTech driven microfinance. It also provides a global comparative view and highlights underexplored areas such as regulatory alignment, women-specific challenges, and context-sensitive digital literacy.

This paper is structured as follows. Section 2. Explain the methodology used in these articles and followed by section 3 which discusses the digital FinTech innovations shaping MFIs. Section 4 examines their role in advancing financial inclusion. Section 5 analyses sustainable performance outcomes and section 6 explore women's empowerment in digital microfinance. Section 7 identifies challenges, emerging trends and research gaps, and strategic implications for policymakers and practitioners. Section 8 concludes with reflections on the way forward.

Through the advancement of this comprehensive synthesis, the review highlights that digital transformation is more than a technological enhancement, it represents a fundamental paradigm shift in redefining the developmental and operational function of MFIs. The significance of this work lies in provision of a cohesive framework that enable researchers, practitioners, and policymakers to strategically leverage FinTech innovations in pursuit of equity, inclusiveness, and sustainable impact.

2. Methodology

The main objective of this review is to address these gaps by systematically analysing the literature on the application of digital FinTech innovations within MFIs, with a focus on enhancing financial inclusion, promoting sustainable performance and advancing women's empowerment. Given the breadth of research disciplines and geographical contexts, this integrative approach offers the necessary flexibility to generate novel insights and respond to critical deficiencies in the current literature review (Sukhera, 2022). Furthermore, this review establishes a conceptual framework to support informed decision-making, enabling researchers to formulate, validate, and refine hypotheses through a critical analysis of previous studies (Holroyd-Leduc, 2002; Jadad et al., 1998). It also serves as a foundation for validating assumption (Portney, 2004), interpreting dynamic findings from existing research (Slavin,

1995) and producing more conclusive outcomes than those derived from isolated primary studies (Hutchison, 1993). Furthermore, the review integrates principles of evidence-based practice (Cowell, 2015) and presents a comprehensive, critically evaluated review of diverse literature sources (Rother, 2007).

2.1. Source of information and search strategy

This review adopts a systematic approach by collecting and analysing existing studies that examine the integration of digital technologies within MFIs, with the aim of enhancing financial inclusion, promoting sustainable performance and advancing women's empowerment. In this study, the data came from a wide range of sources including journal articles, the review or editorial of research paper, book and conference proceedings from SCOPUS database within 2006-2025. Furthermore, Scopus databases remain the main and most comprehensive sources of publication metadata and impact indicators, while offers several advantages for researchers, including a vast and diverse collection of scientific literature, advanced search capabilities, and robust citation analysis tools as well as provides features like author and institution profiles, integration with other tools, and can be a valuable resource for tracking research impact and identifying trends (Bakhmat et al., 2022; Burnham, 2006).

Specifically, to make the search broad as well as specific, it used terms as well as sentences relevant to the study objective like "microfinance institution", "MFIs", "Mobile banking", "digital FinTech" as well as "financial inclusion". Systematic application of Boolean operators ("AND" & "OR") was used to connect terms & search in the database. Though this is not systematic review applying the conventional protocols, this search strategy sufficed for the in-depth study of both established as well as new situations in digital Fintech for improved financial inclusion, sustainable performance as well as empowerment of women in microfinance institutions

2.2.Inclusion and Exclusion Criteria

To ensure the rigor and focus of this narrative review, we conducted searches to identify and select studies pertinent to the topic within the specified period of 2010–2023. The SCOPUS database was utilized to identify peer-reviewed articles relevant to the established scope of the study. Subsequently, primary retrieval, assessment, and evaluation of potentially relevant study samples were conducted in accordance with the inclusion and exclusion criteria presented in Table 2 below. This study screens all the searched paper by choosing the criteria for article selection via the automatic sorting function available in the database as listed in Table 2 below.

Table 2: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Study area/focus	Studies on FinTech and digital innovation in microfinance companies, both original and conclusive.	Scientific publications that are not within the scope of the review and research question
Timeframe	Articles published between 2006-2025 based on database availability of study	-
Document type	Article journal, review, book, conference paper and book chapter	-
Language	Written in English	Written in other language
publication stage	Full text and Final stage	Articles that are unretrievable, abstract only, brief surveys, and retracted complete content

2.3. Research Design

A narrative review study with a deductive thematic content analysis (Braun & Clarke, 2006), we focus on primary themes identified in the preliminary literature review: (1) digital fintech innovations in microfinance institutions, (2) enhancing financial inclusion through digital fintech, (3) sustainable performance of microfinance institutions and (4) women's empowerment through digital microfinance to clarify the mechanisms through which fintech facilitates social and financial objectives, while also exposing persistent constraints. During data extraction, each objective, methodologies, findings, and recommendations of each study were analysed, highlighting pertinent data points that corresponded with the four primary themes. Data were subsequently categorized into distinct subthemes, including "Mobile banking and digital payment platforms", "expanding access to underserved populations", "balancing financial and social performance" and "empowering female entrepreneurs and agents". This approach enabled primary themes to be deductively applied to the extracted data, while subthemes were included inductively if they provided meaningful insight within the review's scope. This synthesized data structure ensures a comprehensive synthesis of findings from multiple studies. This adaptable method upheld methodological precision in the extraction and analysis of data.

3. Digital Fintech Innovations In Microfinance Institutions

3.1.Mobile Banking and Digital Payment Platforms

Mobile banking and digital payment services are among the most widely adopted fintech innovations in microfinance institutions (MFIs), which have increased outreach expansion, reduced costs, and enhanced efficiency. What is important is that these services remove geographical and infrastructural barriers, primarily in rural areas where formal finance services are poor. These services are the first point in digitalization, bridging formal finance services and excluding populations.

Without question, Marfo et al. (2025) demonstrated, through Ghanaian MFIs' regression analysis, that mobile-enabled services reduced delinquency rates by 15% while enhancing repayment performance. From another perspective, Henegar et al. (2024) underscored, through Romanian qualitative interviews, that cultural imperatives such as staff readiness and client trust were as significant as infrastructural capacity. Similarly, Liu et al. (2023) furnished quantitative data from Ghana indicating that mobile money adoption resulted in improved client satisfaction and enhanced institutional competitiveness, albeit accompanied by substantial transition costs that caused a temporary decline in profitability. Carrying this line of inquiry forward, Jalil (2021) replicated these findings with Malaysian evidence, portraying that mobile platforms facilitated rural entrepreneurship while expanding access to finance among women, though lingering connectivity issues postponed scalability.

Generally, existing studies indicate that digital innovations in microfinance offer both significant benefits and notable challenges. These technologies have the potential to expand outreach and improve operational efficiency. However, their effectiveness is often contingent upon contextual factors such as local infrastructure, user capabilities and institutional readiness. A critical gap identified across the literature is the lack of longitudinal and cross-regional research that examines how cultural, infrastructural, and financial dynamic evolve over time to support the sustainable integration of digital finance within microfinance systems. Despite variations in findings, there is broad consensus on the transformative potential of mobile banking in enhancing accessibility and efficiency. Moreover, the literature diverges in its assessment of the costs associated with transitioning legacy systems to mobile banking as well

as in identifying socio-cultural barriers to adoption. These discrepancies underscore that mobile platforms do not inherently guarantee superior outcomes. Their success depends on the presence of adequate digital literacy, synergistic collaboration between human and technological resources and the development of robust supporting infrastructure.

3.2.Artificially Intelligence and Data Analytics

Machine learning and big data are reshaping the operational landscape of microfinance institutions (MFIs), enabling them to extend services to underserved communities more effectively. By leveraging advanced algorithms and alternative data sources, these technologies enhance risk management, credit assessment, and fraud prevention methods thereby contributing to greater institutional sustainability. Remarkably, such innovations allow MFIs to engage individuals who lack formal banking histories or access to conventional financial services, thus promoting broader financial inclusion.

Empirical evidence suggests that the integration of artificial intelligence (AI) into MFIs can significantly enhance portfolio resilience and reduce default rates, although it introduces substantial financial costs and data governance complexities (Mondol et al., 2024). AI-driven systems have strengthened loan portfolios by improving repayment performance, yet their implementation demands considerable investment and robust data management frameworks. Ruiz et al. (2020) demonstrated that machine learning applications, particularly those utilizing digital footprints, improved predictive accuracy by 20 %, thereby enabling MFIs to deliver more tailored and effective financial services to underserved borrowers. Similarly, Singh et al. (2022) highlighted that AI-facilitated portfolio optimization enhances investment strategies, allowing MFIs to allocate resources more efficiently through predictive analytics. Furthermore, Ibitoye et al. (2025) reported a marked decline in transaction-based risks due to AI-powered fraud detection mechanisms, although adoption remains uneven due to infrastructural disparities and limitations in human capital.

The findings of the study affirm the substantial potential of artificial intelligence (AI) to enhance microfinance operations, particularly in terms of efficiency, risk management, and service accessibility. However, they also reveal conflicting realities: while institutions with the financial capacity to adopt advanced technology are strengthened, those lacking such resources risk being further marginalized. Additionally, concerns surrounding algorithmic bias and data security pose significant barriers to AI implementations, especially in economically fragile and vulnerable context. Ultimately, AI should be regarded as a complementary tool within microfinance systems rather than wholesale replacement. Its effective deployment depends on the presence of regulatory safeguards, institutional preparedness, and adequate digital competencies.

3.3.Blockchain and Cryptocurrencies

Blockchain and cryptocurrencies represent emerging financial technologies with transformative potential for microfinance potential. Notably, they can enhance transparency, promote accountable governance, and reduce administrative overhead. The decentralized nature of blockchain provides MFIs with secure, tamper-resistant transaction records, while smart contracts enable process automation-minimizing fraud and lowering operational costs. Additionally, cryptocurrencies offer a mechanism for low-cost cross-border payments, thereby expanding access to financial services for unreserved populations.

Firstly, empirical evidence suggests that blockchain-based lending platforms significantly bolster institutional trust by embedding secure and transparent operational mechanisms (Hoque

et al., 2024). Conversely, cryptocurrency-driven systems establish connections between microfinance institutions, borrowers, and educational entities, facilitating the concurrent delivery of financial services and capacity-building initiatives (Souza et al., 2021). This Empirical evidence also backed by Yeow et al. (2018) which mentioned that blockchain technology in Indonesia has demonstrates the effectiveness of blockchain-enabled analytics in enhancing poverty monitoring, thereby allowing microfinance institutions to more effectively track client outcomes. Implementations remain, however, largely experimental. Hoque et al. (2024) further noted that in the absence of coherent regulatory regimes, blockchain fails to realize transformative potential.

Secondly, ongoing issues with digital skills and internet access might keep rural people from getting included where existing disparities in digital literacy and infrastructure pose a threat to further marginalizing rural communities. Unlike mobile banking, the application of blockchain technology within microfinance institutions (MFIs) remains largely experimental, confined to small-scale pilot projects with limited empirical evidence supporting its widespread adoption (Hoque et al., 2024). To fully harness the potential benefits of blockchain, its implementation must be accompanied by pragmatic strategies that align technological innovation with local capacities and enabling policy environments. This necessitates comprehensive, cross-country research that systematically evaluates not only the technical feasibility of blockchain solutions, but also the regulatory frameworks, infrastructural readiness, and socio-cultural dynamics that underpin their sustainable integration.

3.4.Integration of ICT and Digital Infrastructure

ICT and digital systems serve as foundational drivers of FinTech advancement within MFIs, facilitating transformative changers enhance scalability, operational efficiency and digital capabilities. It improves communication, payment systems and digital platforms, paving the way for mobile banking, AI and blockchain adoption.

Etim and Etim (2022) emphasized that ICT-enabled MFIs in Ghana lowered transaction costs and expanded outreach. In a related context, Nzongang et al. (2022) demonstrated that ICT adoption in Cameroon enhanced competitiveness by facilitating crowdfunding and peer-to-peer lending models. At a global level, Liu et al. (2023) confirmed that ICT investments improved efficiency, although they also noted that transitional costs temporarily heightened credit risk and reduced profitability. Consistently, Dorfleitner et al. (2022) found that ICT integration initially imposed financial strain before generating longer-term sustainability gains. Also, Sabli et al. (2019), Fahmy-Abdullah et al. (2018), Fahmy-Abdullah et al. (2021) and Jofree et al. (2021) state that ICT is a significant factor with a positive impact for efficiency. ICT also one of factors that can bring cities smarter (Mun Chye, C. et. al., 2022; Pajilani et al., 2022) These apparent contradictions suggest that while ICT creates significant opportunities for efficiency and inclusion, its benefits are unevenly distributed. Indeed, Kingu and Gomera (2022) warned that smaller MFIs and enterprises often face restricted access to robust infrastructure, thereby exacerbating digital divides. Moreover, Asnawi et al. (2023) argued that infrastructure alone is insufficient, highlighting the need for complementary institutional capacity building and cross-sector partnerships.

The synthesis indicates that ICT integration is both an opportunity and a challenge in reshaping MFI operations. However, it requires phased investments, targeted support for small MFIs, and policies that address disparities in digital literacy and access due to the absence of comparative, context-sensitive analyses that examine how infrastructure, institutional capacity, and partnership models interact to mitigate uneven benefits and ensure equitable digital inclusion.

4. Enhancing Access To Unserved Populations

4.1.Expanding Access to Unserved Populations

Financial digital FinTech has become the passkey to providing financial services to excluded populations, particularly in rural as well as informal segments. MFIs can reach underserved populations by utilizing mobile channels, agent networks, as well as specialized loan products.

Marfo et al. (2025) observed that capacity building investment enabled Ghanaian MFIs to expand their outreach. Similarly, Bylander (2023) demonstrated that migration loans through MFIs decreased risks for immigrant families, thereby expanding financial inclusion to specialized vulnerable groups. Additionally, Wanzala and Obokoh (2025) noted that mobile loans in Kenya helped more people get involved in the informal job market, but their effectiveness depended on local economic conditions and social factors. At the same time, Chamboko et al. (2021) observed that agent banking in the Democratic Republic of Congo played a critical role in addressing infrastructural gaps, thereby expanding financial access. Similarly, Liu et al. (2024) emphasized that mobile money contribute significantly to customer satisfaction and financial inclusion in Ghana.

Collectively, these studies show that the transformative potential of digital and financial innovations in extending outreach and fostering inclusive financial ecosystem. However, they also reveal some ongoing challenges and restrictions from different settings. This highlights the need for studies that compare different regions to better understand how these solutions can be effectively implemented in diverse environments. Agent banking works well in areas with limited internet access, while mobile money is popular in places where people are good with technology. People agree that financial technology (fintech) should be tailored to suit local needs, combining both online and in-person options.

4.2 Overcoming Barriers to Inclusion

Notwithstanding significant advancements, there are still barriers in the system and culture that limit the full realization of fintech's inclusive capabilities. Research indicates that disparities go beyond mere access to technology, including factors such as income instability, gender, and trust.

Kalenyuk et al. (2024) demonstrated that farmers in rural Kenya still experienced income instability, despite the fact that mobile proximity had decreased delinquency. By contrast, Akeju (2024) demonstrated that ECOWAS strategies employing blockchain expanded women's access, yet smaller MFIs remained constrained by limited resources. In addition, López-Sánchez et al. (2023) reported that Latin America's digital divide, intensified by COVID-19 excluded vulnerable groups due to low levels of digital literacy. Likewise, Henegar et al. (2024) highlighted the significance of cultural distrust in Romania, where organizational culture exerted a stronger influence on adoption than infrastructural development.

Overall, these findings emphasize that while digital and financial innovations offer pathways to inclusion, their success is conditioned by socio-economic, cultural, as well as institutional environments that limit inclusive adoption in diverging regions. Despite the centrality of inclusion's dependence on facilitating interventions in financial education, cultural accommodation, as well as trust building, scant comparative analyses are available on how diverse contextual barriers intersect to define inclusive digital finance's long-run sustainability across regions.

4.3 Role of Digital Credit and Alternative Credit Scoring

Digital credit and non-traditional credit scoring have revolutionized lending to unbanked customers by substituting classical appraisals with digital footprints as well as behavioural information.

Ruiz et al. (2020) demonstrated that predictive accuracy improved by 20% by applying machine learning, consequently providing better credits to non-historical borrowers. Likewise, Sarfo et al. (2021) again confirmed that Madagascar's application of automated assessment helped farmers through reduced biases in standard assessment. Accompanying this with gender, Wahbi et al. (2023) found that repayments for digital as well as standard loans were more inclined among females, consequently supporting credits for women. Correspondingly, López-Sánchez et al. (2022) showcased that mobile app data in Ecuador effectively anticipated repayment performance, consequently supporting institutional sustainability.

Nonetheless, Ashta (2018) cautioned that digital tools alone cannot mitigate systemic risks in the absence of robust management frameworks. The consensus is that these studies underscore the promise of digital and AI-driven tools in expanding credit access and strengthening repayment systems. However, sustainability depends on embedding it into broader regulatory and institutional strategies where there is the need for longitudinal, cross-country analyses that examine how technological innovations interact with gender, institutional capacity, and governance mechanisms to ensure both equity and sustainability in digital microfinance.

5. Sustainable Performance Of Microfinance Institutions

5.1.Balancing Financial and Social Performance

Sustainability in MFIs requires balancing financial viability with social outreach. This "double bottom line" is critical to ensure long-term relevance.

Fersi et al. (2023) conceptualized sustainability as the integration of efficiency with responsibility, emphasizing that fintech can facilitate the pursuit of both objectives. Building on this perspective, Liu et al. (2023) and Dorfleitner et al. (2022) demonstrated that ICT adoption enhanced both profitability and outreach. However, Khan et al. (2025), employing data envelopment analysis, revealed persistent inefficiencies that continue to obstruct the achievement of an optimal balance between financial and social goals. In addition, Cozarenco et al. (2022) cautioned that although subsidies can improve cost efficiency, they simultaneously risk triggering mission drift. Moreover, Kandpal (2022) underscored the importance of equitable resource allocation, particularly in advancing women's financial inclusion.

These findings highlight the complex trade-offs involved in aligning efficiency, profitability, and social responsibility within MFIs. Yet, there is an absence of integrative frameworks and comparative empirical analyses that evaluate how technological adoption, subsidies, and equity-focused strategies can be harmonized to achieve sustainable and inclusive microfinance performance. Although FinTech provides mechanisms to align both financial and social objectives, there remains a persistent risk that profit-driven imperatives may overshadow inclusive development goals. Therefore, robust governance frameworks are essential to safeguard equity and ensure that technological advancements contribute meaningfully to inclusive financial systems

5.2.Digital FinTech as a Driver of Sustainability

Fintech contributes to sustainability by reducing operational costs and broadening service outreach, thereby enhancing institutional viability. Case studies by Alhassan et al. (2025) demonstrate that FinTech-enabled service delivery not only improved financial performance but also promoted inclusiveness across underserved segments. Complementing this, Khanchel et al. (2025) emphasize that ecosystem readiness, encompassing regulatory support, digital infrastructure and stakeholder engagement, plays a critical role in reinforcing the effectiveness and resilience of FinTech initiatives.

Despite the efficiency gains and expanded outreach enabled by digitalization, inconsistencies persist in its adoption across microfinance institutions (MFIs). Siwale and Godfroid (2022) caution that over-digitization may erode the traditional trust-based relationships that underpin microfinance models, particularly in community-centric contexts. Similarly, Alhanatleh et al. (2024) highlight the critical role of cybersecurity awareness in cultivating and maintaining customer trust, emphasizing that secure digital systems are essential for long-term institutional sustainability. Moreover, Uddin and Barai (2022) identify structural and financial constraints that disproportionately affect smaller MFIs, limiting their capacity to integrate digital technology effectively. Collectively, these findings affirm that while digitalization enhances operational efficiency and outreach, its success depends on context-sensitive implementation, robust security measures, and institutional readiness. However, there are still doubts about trust, security, and how well institutions can adapt, which affect the decision to adopt these technologies. This emphasizes the need for thorough studies on how microfinance institutions (MFIs) can mix new technology with public trust, strong cybersecurity, and limited resources. This is important to make sure that their digital changes are sustainable and that they find a good balance between technology and human connections.

5.3.Case Studies and Empirical Evidence

Recent empirical findings reveal both opportunities and challenges in the digital transformation of financial services. Mohamed & Elgammal (2024) highlight that branchless banking models hold significant potential to expend financial access, particularly in underserved regions. However, these models are often accompanied by elevated credit risks during their early implementation phases, necessitating careful risk management strategies. In parallel, Prior & Mora (2019) demonstrate that digital partnerships can substantially reduce operational costs while diversifying financial service offerings, thereby enhancing customer choice and institutional competitiveness. These findings underscore the importance of balancing innovation with prudent oversight to ensure sustainable and inclusive financial expansion.

Kore et al. (2024) outlined community-level interventions in Indonesia, whereby alliances extended fellowships and food aid, integrating social as well as financial targets. Alhassan et al. (2025) noted fintech resilience during crises, while Islamic finance models combined fintech with ethical values for inclusive sustainability (Ascarya & Sakti, 2021; Hamdan et al., 2023). Yet, Cozarenco et al. (2022) and Siwale and Godfroid (2022) cautioned that digital efficiency risks excluding the poorest clients. The implication is that sustainability is maximized when fintech is embedded in strategies that balance efficiency with inclusiveness.

6. Women's Empowerment Through Digital Microfinance

6.1.Empowering Female Entrepreneurs and Agents

Microfinance has long been a vehicle for women's empowerment, and digitalization has expanded this potential. For instance, ICT-enabled MFIs have been shown to lower costs and increase women's entrepreneurial access (Etim & Etim, 2022). Similarly, Mia and Sangwan (2024) found that greater gender diversity on MFI boards correlated with increased donations for women-led ventures. In addition, Chamboko et al. (2021) highlighted that women often prefer female agents, although female representation within MFIs remains limited. Nonetheless, Chamboko and Guvuriro (2022) observed that women are still less likely than men to access loans, underscoring persistent barriers despite ongoing digital advances.

Overall, these findings illustrate that while digitalization and institutional reforms have opened new pathways for women's empowerment, entrenched gender gaps in access and representation endure but that empowerment depends on both institutional representation and grassroots inclusivity. These points highlight the need for intersectional, cross-country analyses that examine how digital tools, governance structures, and agent representation can be leveraged more effectively to dismantle systemic gender inequalities in microfinance.

6.2.Digital Financial Inclusion for Women

Digital financial services have improved women's access, yet their overall impact continues to be tempered by socio-cultural barriers. For example, Akeju (2024) documented ECOWAS initiatives that integrated digital payments to extend outreach to rural women. However, Ndione et al. (2024) found that rising female entrepreneurship in WAEMU did not automatically translate into greater inclusion, as systemic constraints persisted. In support of more tailored approaches, Bal and Anil (2024) demonstrated that programmed integrating digital tools enhanced women's autonomy and savings. At the same time, Altaf et al. (2025) highlighted cultural restrictions in Pakistan that limited women's uptake of fintech, while Altaf and Ullah (2022) emphasized the role of policy reforms that integrate advocacy and education. These studies affirm that digital financial services can empower women, but their effectiveness is conditioned by structural and cultural factors. This underscores the need for longitudinal and cross-regional analyses that investigate how digital innovations, policy reforms, and socio-cultural dynamics intersect to shape the sustainability of women's financial inclusion.

6.3.Financial Literacy and Capacity Building

Access alone does not guarantee empowerment; rather, financial literacy is essential. For instance, Boyd and Díez-Amigo (2023) found in Peru that short-term financial education produced minimal empowerment outcomes, thereby underscoring the need for long-term, context-specific programmers. Similarly, López-Sánchez et al. (2023) emphasized that accounting and financial education are critical for vulnerable groups to fully leverage digital financial services. Extending this discussion to Islamic microfinance, Hamdan et al. (2023) demonstrated that ICT-integrated Islamic microfinance enhanced women's entrepreneurial sustainability. Furthermore, Ascarya and Sakti (2021) introduced hybrid Islamic models that integrate commercial and social funding via digital platforms, thus enhancing women's agency.

The evidence agrees that financial literacy and faith-based innovations play a pivotal role in ensuring that digital finance translates into genuine empowerment. However, limited evidence exists on how the integration of financial education, digital tools, and culturally embedded models such as Islamic microfinance can be systematically scaled and adapted across diverse

socio-economic contexts to ensure women translate digital access into sustainable empowerment.

7. Discussion

This review critically explores the transformative role of digital financial technologies in reshaping the operational and developmental agendas of microfinance institutions (MFIs), particularly in advancing financial inclusion, sustainable performance, and women's empowerment. Drawing on evidence from diverse geographical and institutional contexts, it highlights how innovations such as mobile banking, digital payment systems, artificial intelligence (AI), and blockchain have redefined the mechanisms through which MFIs generate value and extend their outreach.

The findings indicate that digitalization significantly reduces transaction cost, enhances operational efficiency, and improves access to credit for previously excluded populations (Marfo et al., 2025; Liu et al., 2023). For instance, mobile money services in Kenya and Ghana have led to improved repayment rates and heightened customer satisfaction, while digital platforms in Malaysia have facilitated outreach to rural communities and supported women's entrepreneurial activities (Jalil, 2021; Marfo et al., 2025). Gender-sensitive interventions such as the inclusion of female agents and the use of customized credit scoring, have further contributed to women's empowerment (Henegar et al., 2024). Similarly, Islamic microfinance models integrated with information and communication technology (ICT) demonstrate contextually grounded empowerment by aligning ethical finance principles with digital innovation (Hamdan et al., 2023; Ascarya and Sakti, 2021). Nevertheless, complementary measures such as financial literacy programs, advocacy initiatives, and institutional inclusion remain essential to translating digital access into meaningful and sustained empowerment (Boyd and Díez-Amigo, 2023; López-Sánchez et al., 2023).

Similarly, Islamic microfinance, when integrated with information and communication technology (ICT), exemplifies context-sensitive empowerment by aligning ethical finance principles with digital innovation (Hamdan et al., 2023; Ascarya and Sakti, 2021). However, realizing the full potential of digital inclusion requires complementary interventions such as financial literacy programs, advocacy initiatives and institutional reforms to ensure that access translates into meaningful empowerment (Boyd and Díez-Amigo, 2023; López-Sánchez et al., 2023).

Despite these promising developments, persistent challenges continue to hinder progress. Disparities in digital access between urban and rural regions disproportionately affect vulnerable populations (López-Sánchez et al., 2023), while smaller financial institutions often struggle with transition costs and infrastructural limitations (Uddin and Barai, 2022; Khan et al., 2025). Socio-cultural obstacles, including distrust of digital systems and gender-related issues, further complicate adoption and usage (Henegar et al., 2024; Altaf et al., 2025).

Moreover, the rise of efficiency-driven digital models introduces the risk of mission drift, whereby the pursuit of profitability may compromise outreach to the poorest and most marginalized clients (Cozarenco et al., 2022). These tensions illustrate that while fintech holds transformative potential, its effectiveness is mediated by institutional readiness, regulatory environments, and cultural dynamics. The capital utilisation needs to be in tandam with the skills of employees to adapt to new technologies (Fahmy-Abdullah et al., 2019; Hashim et al., 2024).

Several research gaps remain unresolved. First, integrated frameworks that reconcile sustainability, profitability, and social outreach are underdeveloped (Fersi et al., 2023). Second, gendered impacts of fintech—particularly intra-household bargaining power and long-term empowerment trajectories—remain insufficiently examined (Wahbi et al., 2023). Third, there is limited empirical evidence on blended models that combine digital tools with relational, trust-based practices in low-literacy communities (Siwale & Godfroid, 2022). Addressing these gaps requires longitudinal and mixed-method studies capable of tracking behavioral changes, repayment patterns, and empowerment outcomes across time and space. Comparative cross-country analyses would also illuminate how regulatory, infrastructural, and cultural factors shape adoption and impact.

Looking forward, researchers should adopt participatory and interdisciplinary approaches, integrating insights from finance, gender studies, development, and information systems. Policy and practice must prioritize enabling environments that balance consumer protection with innovation, alongside investment in ICT infrastructure and digital literacy programmed (Etim & Etim, 2022; Nzongang et al., 2022). Collaboration between MFIs, fintech firms, governments, and civil society is essential for scaling innovations, pooling resources, and mitigating risks (Hoque et al., 2024). Practical strategies include blockchain-based credit registries for transparency (Yeow et al., 2018), AI-driven tools for inclusive credit scoring (Ruiz et al., 2020), and regulatory sandboxes that allow safe experimentation (Alhanatleh et al., 2024).

Overall, digital FinTech innovations are reshaping the microfinance landscape by expanding access and creating new opportunities for inclusion and empowerment. However, their transformative potential can only be fully realized when technological adoption is embedded within broader social, cultural, and institutional frameworks. The imperative for policymakers, practitioners, and researchers is clear: digitalization must be approached not as a standalone enhancement but as a strategic development pathway that positions MFIs as key agents of equitable and sustainable advancement.

8. Conclusion

This review was set out to systematically analyse how digital FinTech innovations are reshaping MFIs in terms of financial inclusion, sustainable performance, and women's empowerment. The evidence affirms that digitalization is not merely a technical enhancement, but a transformative shift that repositions MFIs as strategic actors in inclusive development and poverty alleviation. Mobile money and digital payments systems consistently reduce transaction costs and expand access for historically marginalized population (Marfo et al., 2025; Liu et al., 2023). Moreover, gender-sensitive approaches and ICT-enabled Islamic microfinance programs offer tailored empowerment strategies that strengthen women’s agency and entrepreneurial participation (Hamdan et al., 2023; Ascarya & Sakti, 2021; Henegar et al., 2024). These findings underscore the capacity of financial technology to enhance institutional efficiency while promoting social equity.

However, the review also reveals persistent challenges. Transition costs, digital infrastructure gaps, trust deficits and sociocultural constraints continue to impede equitable adoption, particularly among smaller and resource-constrained MFIs (López-Sánchez et al., 2023; Uddin and Barai, 2022; Altaf et al., 2025). Addressing these barriers requires a holistic approach that integrates technological innovation with inclusive policy design, capacity-building and culturally attuned implementation strategies. Besides, efficiency-focused digital models are

susceptible to mission drift capable of diluting the social mission in microfinance (Cozarenco et al., 2022). Such contradictions reveal that technology alone cannot guarantee empowerment without complementary interventions in financial literacy, institutional capacity building, and inclusive regulatory frameworks (Boyd & Díez-Amigo, 2023; Nzongang et al., 2022).

Looking ahead, the most critical research gaps concern the absence of integrative frameworks that balance sustainability with outreach (Fersi et al., 2023), the limited exploration of gendered dynamics within fintech adoption (Wahbi et al., 2023), and the lack of longitudinal and cross-country studies capable of capturing behavioral and empowerment outcomes over time (Siwale & Godfroid, 2022). Addressing these will require participatory, interdisciplinary, and mixed method approaches that place women clients, rural communities, and MFI practitioners at the centre of inquiry. Such designs would generate insights not only into adoption and repayment but also into resilience, autonomy, and social empowerment across diverse contexts.

The significance of this article lies in its integrative perspective: unlike earlier fragmented analyses, it unites financial inclusion, sustainability, and women's empowerment under the lens of fintech-driven microfinance, offering a global comparative synthesis. By doing so, it provides a strategic roadmap for policymakers, practitioners, and researchers seeking to harness fintech for inclusive development.

Ultimately, why does all this matter? Because digitalization represents both a promise and a paradox. If pursued as a deliberate developmental strategy—aligned with social missions, ethical practices, and enabling environments—fintech can position MFIs as pivotal agents of equitable and sustainable growth. However, if adopted without sensitivity to cultural, institutional, and gendered realities, it risks reinforcing exclusion rather than dismantling it. The clear message is that digital fintech, when embedded thoughtfully, holds the potential not just to modernize microfinance, but to transform it into a cornerstone of inclusive, gender-responsive, and sustainable development.

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Conflict of Interest
The authors declare that there is no conflict of interest regarding the publication of this study.

References

Akeju, K. F. (2024). Gender and digital financial inclusion: Assessment of rural/urban dichotomy in microfinance and table banking operations in ECOWAS. In *Sustainable Development Goals Series* (pp. 123–133). Springer. https://doi.org/10.1007/978-3-031-53337-2_11

Alhanatleh, H., Khaddam, A., Abudabaseh, F., Alghizzawi, M., & Alzghoul, A. (2024). Enhancing the public value of mobile fintech services through cybersecurity awareness antecedents: A novel framework in Jordan. *Investment Management and Financial Innovations, 21*(1), 417–430. https://doi.org/10.21511/imfi.21(1).2024.32

Alhassan, Y., Nwagbara, U., & Bellamy, L. C. (2025). The impact of FinTech integration on the accessibility and sustainability of microfinance institutions: A case study approach.

In *Microfinance, Financial Innovation, and Sustainable Entrepreneurship in Economics* (pp. 183–211). IGI Global. https://doi.org/10.4018/979-8-3693-6622-6.ch007

Altaf, M., Azam, M., Khan, L., Siddiqui, N., Zia-ul-Rehman, M., & Hussain, A. (2025). Designing a Centralized Smart City Model: A Conceptual Model for Integrated Urban Services. *The Asian Bulletin of Big Data Management, 5*(2), 164–174. https://doi.org/10.62019/qhjx3w03

Ascarya, A., & Sakti, A. (2021). Proposing new Islamic microfinance model for sustainable Islamic microfinance institution. In *Islamic Finance and Sustainable Development: A Sustainable Economic Framework for Muslim and Non-Muslim Countries* (pp. 349–378). Springer. https://doi.org/10.1007/978-3-030-76016-8_15

Ascarya, A. (2024). An investigation of waqf-based Islamic micro financial institution models to identify the most effective model for Indonesia. *Journal of Islamic Accounting and Business Research*. https://doi.org/10.1108/jiabr-12-2022-0325

Ashta, A. (2018). News and trends in fintech and digital microfinance: Why are European MFIs invisible? *FIIB Business Review*, *7*(4), 232–243. https://doi.org/10.1177/2319714518805183

Asnawi, A., Amrawaty, A. A., & Nirwana. (2023). Strategy in developing microfinance institutions to support beef cattle farming business in rural areas. *International Journal on Advanced Science, Engineering and Information Technology, 13*(2), 438–445. https://doi.org/10.18517/ijaseit.13.2.16517

Bakhmat, N., Kolosova, O., Demchenko, O., Ivashchenko, I., & Strelchuk, V. (2022). Application of international scientometric databases in the process of training competitive research and teaching staff: opportunities of Web of Science (WoS), Scopus, Google Scholar. *Journal of Theoretical and Applied Information Technology*, *100*(13), 4914-4924.

Boyd, C. M., & Díez-Amigo, S. (2023). Effectiveness of free financial education provided by for-profit financial institutions: Experimental evidence from rural Peru. *Economics of Education Review, 97*, 102462.https://doi.org/10.1016/j.econedurev.2023.102462

Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Burnham J. F. (2006). Scopus database: A Review. *Biomedical digital libraries, 3*, 1. https://doi.org/10.1186/1742-5581-3-1

Bylander, M. (2023). Migration speculation: microfinance and migration in the Global South. *Third World Quarterly*, *44*(9), 2136–2153. https://doi.org/10.1080/01436597.2023.2221190

Chamboko, R., & Guvuriro, S. (2022). On the predictors of loan utilization and delinquency among microfinance borrowers in Zimbabwe: A Poisson regression approach. *Cogent Economics & Finance, 10*(1), 2111799. https://doi.org/10.1080/23322039.2022.2111799

Chamboko, R., Cull, R., Giné, X., Heitmann, S., Reitzug, F., & Van Der Westhuizen, M. (2021). The role of gender in agent banking: Evidence from the Democratic Republic of Congo. *World Development, 146*, 105551. https://doi.org/10.1016/j.worlddev.2021.105551

Cowell, J. M. (2015). The advantage of literature reviews for evidence-based practice. *The Journal of School Nursing*, *31*(1), 5-5.

Cozarenco, A., Hartarska, V., & Szafarz, A. (2022). Subsidies to microfinance institutions: How do they affect cost efficiency and mission drift? *Applied Economics, 54*(44), 5099–5132. https://doi.org/10.1080/00036846.2022.2041176

Dorfleitner, G., Forcella, D., & Nguyen, Q. A. (2022). The digital transformation of microfinance institutions: An empirical analysis. *Journal of Applied Accounting Research, 23*(2), 454–479. https://doi.org/10.1108/JAAR-02-2021-0041

Etim, A. S., & Etim, D. N. (2022). Gender, ICT, and micro-loans for small business operations in Ghana. In *Research anthology on microfinance services and roles in social progress* (pp. 287–302). IGI Global. https://doi.org/10.4018/978-1-6684-7552-2.ch016

Fahmy-Abdullah, M., Sieng, L. W., & Isa, H. M. (2018). Technical Efficiency in Malaysian Textile Manufacturing Industry: A Stochastic Frontier Analysis (SFA) Approach. *International Journal of Economics & Management*, *12*(2).

Fahmy-Abdullah, M., Sieng, L. W., & Isa, H. M. (2019). Technical Efficiency Evaluation: Study on Malaysian Electrical and Electronics Firms. *Asian Academy of Management Journal*, *24*(2), 1-19.

Fahmy-Abdullah, M., Sieng, L. W., & Isa, H. M. (2021). Technical Efficiency in Malaysian Manufacturing Firms: A Stochastic Frontier Analysis Approach. *Journal of Sustainability Science and Management*, *16*(6). https://doi.org/10.46754/jssm.2021.08.02

Fersi, M., Boujelbéne, M., & Arous, F. (2023). Microfinance's digital transformation for sustainable inclusion. *European Journal of Management and Business Economics, 32*(5), 525–559. https://doi.org/10.1108/EJMBE-10-2022-0332

Hamdan, N. H., Kassim, S., Mustapha, N. D., & Seman, S. A. (2023). Structure analysis of Islamic microfinancing, social capital and ICT usage towards women micro-entrepreneurs' performance in Malaysia. In *Studies in Systems, Decision and Control* (Vol. 470, pp. 163–181). Springer. https://doi.org/10.1007/978-3-031-28314-7_15

Hamdani, S., & Ibenrissoul, A. (2017). Sustainable Microfinance and Global Performance Proposal for a Decision-Making Support Tool. *European Journal of Sustainable Development*, *6*(3), 253-253.

Hashim, N., & Fahmy-Abdullah, M. (2024). Technical Efficiency in the Malaysian Electric and Electronic Manufacturing Industry: A Stochastic Frontier Analysis Approach. *Asian Economic and Financial Review*, *14*(2), 88.

Henegar, D., Ilieș, G. L., Mureșan, I. C., Porutiu, A. R., Arion, I. D., & Arion, F. H. (2024). Customers' perception of microfinance services as a tool for rural development: A Romanian case study. *Agriculture, 14*(7). https://doi.org/10.3390/agriculture14071087

Holroyd-Leduc, J. M. (2002). Helewa A, Walker JM. Critical Evaluation of Research in Physical Rehabilitation: Towards Evidence-Based Practice. Philadelphia: WB Saunders Company, 2000. *Evidence-Based Medicine, 7*(5), 135–135. https://doi.org/10.1136/ebm.7.5.135

Hoque, M. M., Kummer, T.-F., & Yigitbasioglu, O. (2024). How can blockchain-based lending platforms support microcredit activities in developing countries? An empirical validation of its opportunities and challenges. *Technological Forecasting and Social Change, 203*. https://doi.org/10.1016/j.techfore.2024.123400

Hutchison, B. G. (1993). Critical appraisal of review articles. *Canadian Family Physician, 39*, 1097.

Ibitoye, O. A., Ogundele, A. T., Monehin, J. O., Abraham, A., Ilugbusi, B. S., & Francis, A. O. (2025). Investigating the nexus between financial inclusion and poverty reduction in Nigeria (2013–2023). *Journal of Sustainable Development Law and Policy*, *16*(1), 241–255. https://doi.org/10.4314/JSDLP.V16I1.13

Jadad, A. R., Cook, D. J., Jones, A., Klassen, T. P., Tugwell, P., Moher, M., & Moher, D. (1998). Methodology and reports of systematic reviews and meta-analyses: a comparison of Cochrane reviews with articles published in paper-based journals. *Jama*, *280*(3), 278-280.

Jalil, M. F. (2021). Microfinance towards micro-enterprises development in rural Malaysia through digital finance. *Discover Sustainability, 2*(1). https://doi.org/10.1007/s43621-021-00066-3

Jofree, A. F. M., Hashim, N., Fahmy-Abdullah, M., Sieng, L. W. & Ridzuan, S. (2021). Efficiency Assessment of Transport Manufacturing Firms Using a Stochastic Frontier Analysis Approach. *Sains Malaysiana*, *50*(8), 2445-2453. http://doi.org/10.17576/jsm-2021-5008-25

Kalenyuk, I., Kuklin, O., Panchenko, Y., Djakona, A., & Bohun, M. (2024). Financial innovations in the smart city ecosystem. *Financial and Credit Activity: Problems of Theory and Practice, 1*(54), 102–113. https://doi.org/10.55643/fcaptp.1.54.2024.4287

Kandpal, V. (2022). Socio-economic development through self-help groups in rural India: A qualitative study. *Qualitative Research in Financial Markets, 14*(5), 621–636. https://doi.org/10.1108/QRFM-10-2021-0170

Khan, A., Goswami, A., & Choudhury, T. (2025). Technology gaps, social outreach and financial sustainability of South Asian MFIs: Bootstrap DEA meta-frontier approach. *Electronic Commerce Research, 25*(3), 1577–1606. https://doi.org/10.1007/s10660-023-09747-9

Khanchel, I., Lassoued, N., & Khiari, C. (2025). Untangling the skein: The impact of fintech on social and financial performance in microfinance institutions. *Regional Science Policy & Practice, 17*(8). https://doi.org/10.1016/j.rspp.2025.100208

Kingu, A., & Gomera, W. C. (2022). An assessment of the impact of digitalization of microcredit services on micro and small enterprises. *African Journal of Applied Research, 8*(1), 121–137. https://doi.org/10.26437/ajar.03.2022.9

Kore, M. H. R., Rokhim, R., & Rahmawati, R. (2024). Strategic alliances and social performance of microfinance institutions in Indonesia. *Strategic Change, 33*(3), 219–232. https://doi.org/10.1002/jsc.2572

Liu, A., Urquía-Grande, E., López-Sánchez, P., & Rodríguez-López, Á. (2023). Research into microfinance and ICTs: A bibliometric analysis. *Evaluation and Program Planning, 97,* 102215. https://doi.org/10.1016/j.evalprogplan.2022.102215

Liu, R., Wang, Z., Sindakis, S., & Showkat, S. (2024). Unlocking financial inclusion through ICT and mobile banking: A knowledge-based analysis of microfinance institutions in Ghana. *Journal of the Knowledge Economy, 15*(2), 9723–9755. https://doi.org/10.1007/s13132-023-01460-0

López-Sánchez, P., & Urquía-Grande, E. (2023). Mind the gap in financial inclusion! Microcredit institutions fieldwork in Peru. *Revista de Contabilidad – Spanish Accounting Review, 26*(1), 27–45. https://doi.org/10.6018/rcsar.432671

López-Sánchez, P., Urquía-Grande, E., del Campo, C., & Cancer, A. L. (2022). Delving into the determinants of default risk in savings groups: Empirical evidence from Ecuador. *European Journal of Development Research, 34*(6), 2625–2650. https://doi.org/10.1057/s41287-021-00480-3

Louw, C., & Nieuwenhuizen, C. (2020). Digitalisation strategies in a South African banking context: A consumer services analysis. South African Journal of Information Management, 22(1), 8. https://doi.org/10.4102/SAJIM.V22I1.1153

Marfo, M., Ofei, E. F., Annan, E., Armah, A. A., Adadevoh, L., Ofei, E. B., & Asante, C. R. (2025). The impact of competitive advantage on the sustainability of microfinance institutions in Ghana: Assessing the moderating role of capacity building. *SN Business & Economics, 5*(7). https://doi.org/10.1007/s43546-025-00857-0

Mia, M. A., & Sangwan, S. (2024). Board gender diversity and donations in the microfinance industry: Evidence from emerging economies. *Journal of Sustainable Finance & Investment.* Advance online publication. https://doi.org/10.1080/20430795.2024.2393237

Milana, C., & Ashta, A. (2020). Microfinance and financial inclusion: Challenges and opportunities. *Strategic Change, 29*(3), 257–266. https://doi.org/10.1002/jsc.2339

Mohamed, T. S., & Elgammal, M. M. (2024). Does the extent of branchless banking adoption enhance the social and financial performance of microfinance institutions? *Applied Economics, 56*(14), 1671–1688. https://doi.org/10.1080/00036846.2023.2177595

Mondol, S., Satpathy, I., Patnaik, B. C. M., Nayak, A., Patnaik, A., & Khang, A. (2024). Impact of AI and data in revolutionizing microfinance in developing countries: Improving outreach and efficiency. In *Data-driven modelling and predictive analytics in business and finance: Concepts, designs, technologies, and applications* (pp. 71–87). CRC Press. https://doi.org/10.1201/9781032618845-5

Mun Chye, C., Fahmy-Abdullah, M., Sufahani, S. F., & Bin Ali, M. K. (2022, February). A Study of Smart People Toward Smart Cities Development. In *Proceedings of the Third International Conference on Trends in Computational and Cognitive Engineering: TCCE 2021* (pp. 257-271). Singapore: Springer Nature Singapore.

Ndione, M., Ashta, A., & Bako Liba, B. B. (2024). Banks, microfinance institutions and fintech: How the ratio of male and female entrepreneurs moderates their capacity for financial inclusion. *Cogent Economics & Finance, 12*(1). https://doi.org/10.1080/23322039.2024.2402031

Nzongang, J., Hikouatcha, P., Tagne, A. G. F., & Nguenbu, T. (2022). Do information and communication technologies (ICT) promote the competitiveness of microfinance institutions (MFIs) in Cameroon? *Recherches en Sciences de Gestion, 148*(1), 147–172. https://doi.org/10.3917/resg.148.0147

Pajilani, N. D. B., Fahmy-Abdullah, M., Sufahani, S. F., & Ali, M. K. B. (2022, February). Smart Economy Through Smart Cities. In *Proceedings of the Third International Conference on Trends in Computational and Cognitive Engineering: TCCE 2021* (pp. 285-297). Singapore: Springer Nature Singapore.

Portney, L. G. (2004). Evidence-based practice and clinical decision making: it's not just the research course anymore. *Journal of Physical Therapy Education*, *18*(3), 46-51.

Prior, F., & Mora, T. (2019). Quantitative study on the impact of branchless banking on microfinance institutions. *Annals of Public and Cooperative Economics*, *90*(4), 641–668. https://doi.org/10.1111/apce.12252

Roodman, D. (2013). Armageddon or adolescence? Making sense of microfinance's recent travails. In *Microfinance 3.0: Reconciling sustainability with social outreach and responsible delivery* (pp. 13–40). Springer. https://doi.org/10.1007/978-3-642-41704-7_2

Rother, E. T. (2007). Systematic literature review X narrative review. *Acta paulista de enfermagem*, *20*, v-vi.

Ruiz, S., Gomes, P., Rodrigues, L., & Gama, J. (2020). Assembled feature selection for credit scoring in microfinance with non-traditional features. In *Lecture notes in computer science: Vol. 12323. Advances in intelligent data analysis XVIII* (pp. 207–216). Springer. https://doi.org/10.1007/978-3-030-61527-7_14

Sabli, M. A. N., Fahmy-Abdullah, M., & Sieng, L. W. (2019). Application of two-stage data envelopment analysis (DEA) in identifying the technical efficiency and determinants in the plastic manufacturing industry in Malaysia. *International Journal of Supply Chain Management*, *8*(6).

Sarfo, Y., Musshoff, O., Weber, R., & Danne, M. (2021). Farmers' willingness to pay for digital and conventional credit: Insight from a discrete choice experiment in Madagascar. *PLOS ONE*, *16*(11), e0257909. https://doi.org/10.1371/journal.pone.0257909

Singh, V. P., Bansal, R., & Singh, R. (2022). Big-data analytics: A new paradigm shift in microfinance industry. In *Advances in data science and analytics: Concepts and paradigms* (pp. 275–291). Wiley. https://doi.org/10.1002/9781119792826.ch12

Siwale, J., & Godfroid, C. (2022). Digitising microfinance: On the route to losing the traditional 'human face' of microfinance institutions. *Oxford Development Studies, 50*(2), 177–191. https://doi.org/10.1080/13600818.2021.1998409

Slavin, R. E. (1995). Best evidence synthesis: an intelligent alternative to meta-analysis. *Journal of clinical epidemiology*, *48*(1), 9-18.

Souza, L. L. F., de Freitas, A. A. F., Souza, J. T., & Câmara, S. F. (2021). Cryptocurrencies for microfinance. *BAR - Brazilian Administration Review, 18*(spe). https://doi.org/10.1590/1807-7692bar2021200063

Sukhera, J. (2022). Narrative reviews: flexible, rigorous, and practical. *Journal of graduate medical education*, *14*(4), 414-417.

Uddin, H., & Barai, M. K. (2022). Will digital revolution be disruptive for inclusive finance in Bangladesh? The case of the microfinance industry. *Evergreen, 9*(4), 909–923. https://doi.org/10.5109/6622878

Wahbi, A., Sarfo, Y., & Musshoff, O. (2023). Female smallholder farmers' preferences for digital and conventional credit attributes: Evidence from Madagascar. *Agricultural Finance Review, 83*(4–5), 549–571. https://doi.org/10.1108/AFR-01-2023-0008

Wanzala, R. W., & Obokoh, L. O. (2025). Financial inclusion of the informal sector of marginalized counties in Kenya. *Cogent Social Sciences*, *11*(1). https://doi.org/10.1080/23311886.2025.2522291

Yeow, A., Lee Kuo Chuen, D., Tan, R., & Chia, M. (2018). Indonesian microfinance institutions (MFI) move to technology—TBOP's Prodigy experience. In *Handbook of Blockchain, Digital Finance, and Inclusion* (Vol. 2, pp. 431–449). Elsevier. https://doi.org/10.1016/B978-0-12-812282-2.00017-6